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## INNOVATION PROFILE

# Costs For 'Hospital At Home' Patients Were 19 Percent Lower, With Equal Or Better Outcomes Compared To Similar Inpatients

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**ABSTRACT** Hospitals are the standard acute care venues in the United States, but hospital care is expensive and can pose health threats for older people. Albuquerque, New Mexico–based Presbyterian Healthcare Services adapted the Hospital at Home® model developed by the Johns Hopkins University Schools of Medicine and Public Health to provide acute hospital–level care within patients' homes. Patients show comparable or better clinical outcomes compared with similar inpatients, and they show higher satisfaction levels. Available to Medicare Advantage and Medicaid patients with common acute care diagnoses, this program achieved savings of 19 percent over costs for similar inpatients. These savings were predominantly derived from lower average length-of-stay and use of fewer lab and diagnostic tests compared with similar patients in hospital acute care. Hospital at Home advances the Triple Aim of clinical quality, affordability, and exceptional patient experience.

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**P**resbyterian Healthcare Services is New Mexico's only private, not-for-profit health care system and its largest provider of care. An integrated system with eight hospitals, the state's largest health plan, and a medical group, Presbyterian provides patients with hospital-level care within the comfort of their homes using highly skilled physicians and nurses supported by advanced technology. This is delivered through Hospital at Home®, a model developed by investigators at the Johns Hopkins University Schools of Medicine and Public Health.

Presbyterian adopted Hospital at Home to better serve an aging population with increasing prevalence of chronic disease and health care service use.<sup>1</sup> Identified challenges were to address hospital bed capacity; control costs of acute care hospitalization; lessen risk of known complications of hospitalization for older patients,

such as infections, falls, use of restraints, urinary incontinence, and functional decline;<sup>2–4</sup> and eliminate care transition gaps when patients move from hospital to home.

Similar challenges inspired Bruce Leff and colleagues at Johns Hopkins to create Hospital at Home. The Hopkins group theorized that the hospital is an unsafe environment for many older adults and that most patients do not want to stay in a hospital. The group speculated that these patients would instead do better at home, where providing acute care is far less expensive. They conducted a national demonstration study offering acute hospital-level care at home as a substitute for traditional hospital care for clinically appropriate patients. Of qualified study patients, 61 percent opted for Hospital at Home care.<sup>5</sup>

Presbyterian executives read about the Hopkins work and had the relevant business unit, Home Healthcare, assess the model as an option

for integrated care. The Home Healthcare staff reached out to the Hopkins team and relevant departments at Presbyterian to investigate the feasibility of replication. In June 2007 the team developed a program framework and a business case for the project with high-level deployment plans that included technical assistance from Hopkins. They launched Hospital at Home in October 2008.

### Program Population

Hospital at Home was initially open to Medicare Advantage and Medicaid members covered through Presbyterian Health Plan. The program expanded its coverage in November 2010 to include commercial health-plan members through a bundled-payment rate reimbursing for the total care provided. Presbyterian selected nine diagnostic groups based on suitability for at-home care and frequency of acute care admissions: exacerbations of congestive heart failure, chronic obstructive pulmonary disease, community-acquired pneumonia, cellulitis, deep venous thrombosis, pulmonary embolism, complicated urinary tract infection or urosepsis, nausea and vomiting, and dehydration. The latter five were added in 2010.

Patients eligible for care in Hospital at Home are sick enough to require hospitalization but meet previously validated medical eligibility criteria to ensure that Hospital at Home care is safe and appropriate for them.<sup>6</sup> These criteria do not exclude patients with multiple chronic conditions. Patients must live in a fixed, regular, and adequate residence—that is, a domicile where they stay consistently that meets needs for safety, shelter, and basic utilities. They must reside within twenty-five miles of a designated Presbyterian emergency department, and they may live alone.

In addition to the diverted patient population for whom hospital admission is avoided altogether, Presbyterian employs an “early discharge” or “transfer” model. For this Hospital at Home approach, hospital inpatients who require continued hospital-level care are “transferred” to the Hospital at Home “unit” for ongoing care. This is similar to how hospital inpatients transfer from, for example, an intensive care unit to a standard unit.

### Hospital At Home Components

**REFERRAL AND ELIGIBILITY ASSESSMENT** Hospital at Home staff members receive referrals and generate them, using the hospital information system to identify patients—both inpatients and emergency department patients—who meet

demographic criteria, including health plan membership, geographical catchment area, age, and diagnosis. They then assess the patients’ medical eligibility for Hospital at Home. Identifying candidates for Hospital at Home care in this way has been helpful in generating referrals for admission to Hospital at Home.

The program also accepts referrals by providers from home health, primary care and subspecialty clinics, urgent care, emergency departments, and inpatient hospitals for early discharge. Eligible patients are given the choice of Hospital at Home or traditional hospitalization. Hospital at Home admits new patients between the hours of 8 a.m. and 5 p.m. daily, including weekends, and provides all-hours care coverage for admitted patients.

**TRANSPORT AND TRANSITION** Program support staff arranges for vendor partners to provide necessary equipment, such as oxygen, medications, infusions, diagnostic services, and transportation. When not already at his or her residence, a Hospital at Home patient is transported home from the hospital, usually by a family member or, if necessary, by ambulance. A nurse or physician meets the patient, providing appropriate medications and equipment and staying as long as medically necessary for admission in the home—typically two to three hours.

**CARE PROVIDERS** Physicians visit patients each day for medical care, diagnosis, and care plan coordination. They have a panel of five daily patients and are available around the clock in case of emergency. When necessary, physicians use portable diagnostic vendor services in the home for radiological and other studies.

Depending on patient acuity, nurses visit once or twice daily to assess the patient, administer infusions and other medications, conduct routine lab tests, perform ordered care procedures, teach patients and families about management of the health condition, and prepare patients for program discharge and transition. Telehealth nurses provide additional remote support by monitoring for important clinical changes via daily telehealth encounters. To participate, patients need a telephone landline and the ability to use the telehealth unit on their own or have someone available in the home capable of using the telehealth unit. The telehealth unit consists of a blood pressure monitor, stethoscope, oximeter, glucometer, and video connection allowing communication for assessments and teaching.

**DISCHARGE AND CARE HAND-OFF** Discharge and care transition planning occurs throughout the admission, with the patient’s readiness for Hospital at Home discharge assessed using the same criteria and guidelines as used for hospital

inpatients. Patients are informed of their transition to skilled home care service or full discharge at least one day before it happens.

On the day of transition or discharge, patients are given necessary prescriptions, and support staff arranges follow-up appointments for physicians or diagnostic studies. Patients are counseled on signs and symptoms of disease recurrence or exacerbation, given phone numbers to use if questions or problems arise, and provided with information on medication administration and side effects. To ensure a smooth transition, physicians communicate with primary care providers and other medical care givers via e-mail, telephone, dictation, and linked electronic health record when possible. Most patients transfer to home health care and continue telehealth support for six weeks or more after discharge.

**PAYMENT MODEL** Hospital at Home care is provided as an alternative to the standard hospital benefit for Presbyterian Health Plan's Medicare Advantage, Medicaid, and commercial populations. This is possible because of Presbyterian's integrated structure, which includes the delivery system, provider group, and health plan. Hospital at Home administrators worked with Presbyterian Health Plan to develop a bundled reimbursement and billing methodology for this

program to move away from the fee-for-service model.

For Medicare Advantage, the patient pays the standard inpatient hospital copayment. This flexibility provides greater choice of settings while maintaining the needed level of covered care.

## Program Results

Between October 2008 and April 2012, there were 582 Hospital at Home patients at Presbyterian (Exhibit 1). Program results detailed in this section and displayed in Exhibit 1 are for the measurement period of January 1, 2009, through December 31, 2010, for Hospital at Home patients and the comparison group of similar hospital inpatients. The Hospital at Home group represents all patients cared for at home through this program. The comparison group, derived from Presbyterian's administrative database of hospital inpatients, mirrors program patients.

Included in the comparison group were patients who were admitted to a non-intensive care unit hospital bed; resided within the Hospital at Home geographic catchment area in central New Mexico; had as their primary diagnosis one of the nine Hospital at Home diagnoses; and were

### EXHIBIT 1

#### Hospital At Home Patients And Comparison Acute Care Hospital Patients: Demographics And Clinical Outcomes, 2009-10

Patient demographics/clinical outcomes	Hospital at Home (N = 323)	Acute care hospital (N = 2,405)
Age, mean years (SD)	76.2 (11.7)	79.5 (8.1)
Number of female patients (%)	174 (53.9)	1,357 (56.4)
<b>NUMBER OF PATIENTS BY RACE AND ETHNICITY (%)</b>		
Caucasian	238 (74)	1,651 (69)
Hispanic	58 (18)	496 (21)
African American	1 (0)	25 (1)
Other	26 (8)	233 (10)
<b>NUMBER WITH EACH PRIMARY ADMISSION DIAGNOSIS (%)</b>		
Community-acquired pneumonia	100 (31)	858 (36)
COPD	80 (25)	480 (20)
Congestive heart failure	60 (19)	718 (31)
Cellulitis	30 (9)	259 (11)
Deep venous thrombosis or pulmonary embolism	7 (2)	3 (1)
Complicated UTI or urosepsis	24 (7)	1 (1)
Dehydration or volume depletion	8 (2)	0 (0)
<b>QUALITY METRICS (%)</b>		
Pneumococcal screening or vaccination for pneumonia patients	100	97
Influenza screening or vaccination for pneumonia patients	100	94
Antibiotics within 6 hours of admission for pneumonia patients	100	91
Evaluation of left ventricular function for congestive heart failure patients	100	99
Use of ACE inhibitor or ARB for congestive heart failure patients	100	96

**SOURCE** Presbyterian Health Services administrative data. **NOTES** SD is standard deviation. COPD is chronic obstructive pulmonary disease. UTI is urinary tract infection. ACE is angiotensin-converting enzyme. ARB is angiotensin receptor blocker.

Medicare Advantage members and age sixty-five or older. Exclusionary criteria for the comparison group were *International Classification of Diseases*, Ninth Revision, Clinical Modification (ICD-9-CM), procedure codes that would have excluded patients from Hospital at Home participation.

During the measurement period, there were 348 qualified patients who were offered Hospital at Home care. Of these patients, 323 (93 percent) opted for care at home rather than the acute care hospital. The inpatient hospital comparison group included 1,048 individuals.<sup>7</sup>

**CLINICAL CHARACTERISTICS** For both groups, patients were elderly, with a majority female and Caucasian, and community-acquired pneumonia was the most common admitting diagnosis. Mean length of Hospital at Home stay was 3.3 days (standard deviation: 2.8), with a median of 3 days and a range of 1–31. The mean stay in the comparison group was 4.5 days (standard deviation: 3.2), with a median of 4 days and a range of 1–50.

Presbyterian's five best-practice core quality-of-care metrics, which are collected and reported in a manner similar to that of the Centers for Medicare and Medicaid Services hospital report methods, were met at high rates in both groups but with 100 percent consistency for Hospital at Home. These core metrics are as follows: pneumococcal screening or vaccination for pneumonia patients, influenza screening or vaccination for pneumonia patients, administration of antibiotics within six hours of admission for pneumonia patients, evaluation of left ventricular function for congestive heart failure patients, and the use of angiotensin-converting enzyme inhibitor or angiotensin receptor blocker for congestive heart failure patients.

For care provision measures, patients in Hospital at Home received an average of 3.5 physician visits (standard deviation: 2.8) and 6.4 nursing visits (standard deviation: 3.2) per admission. Eight patients (2.5 percent) were transferred to the hospital to complete their admission, mostly because their condition worsened. After-hours and unplanned patient visits because of additional assistance needs totaled fifteen nursing visits and three physician visits.

Hospital at Home patients experienced lower rates of falls (0 percent versus 0.8 percent). Readmission to hospital within thirty days of discharge was 10.8 percent for Hospital at Home versus 10.5 for the comparison group. For mortality during the admission, the rate was 0.93 percent for Hospital at Home and 3.4 percent for the comparison group.

**PATIENT SATISFACTION** Patient satisfaction was measured via a thirty-question Press Ganey

Consumer Assessment of Healthcare Providers and Systems survey. Presbyterian also used the standard hospital CAHPS survey and a Hospital at Home custom survey. The program survey was developed with Press Ganey to closely track the hospital version, making comparison meaningful. Responses were assigned weighted scores on a 100-point scale, with higher numbers reflecting higher satisfaction.

Presbyterian sent surveys to all Hospital at Home patients, which yielded 59 returned surveys (18.2 percent). Surveys were sent to a sample of hospital inpatients, and about 8,300 surveys were returned, for a 25 percent response rate. The Hospital at Home overall patient satisfaction mean score of 90.7 exceeded the hospital score of 83.9 for comparable patients.

**FINANCIAL RESULTS** Per patient cost, excluding physician cost, for Hospital at Home was compared to per case acute care inpatient variable costs, which also excluded physician costs. Mean Hospital at Home patient costs were 19 percent lower than mean hospital costs for comparison-group patients. These savings were predominantly derived from lower average length-of-stay and lower use of clinical testing.

Hospital at Home patients used fewer lab and diagnostic tests compared with similar patients in hospital acute care. This pattern has been seen in prior Hospital at Home research.<sup>5</sup> Given the favorable clinical outcomes experienced by Hospital at Home patients, this testing difference may represent overuse of supply-sensitive services among hospital patients—that is, those services with a frequency of use that tends to be determined more by convenience and proximity than on well-articulated medical theory or scientific evidence.

## Implementation Considerations

Hospital at Home can provide integrated systems with the ability to manage and improve health across the continuum, while accounting for and reducing costs. In response to the favorable results Presbyterian has seen for its Hospital at Home program, it has expanded the qualified patient population by increasing the catchment area, extending the time for accepted referrals, allowing participation from commercial health plan members, and adding more diagnoses to the Hospital at Home repertoire.

In addition, Presbyterian's success with Hospital at Home led to the development and implementation of a medical house call program to prevent additional avoidable hospitalizations and to provide ongoing care in the home for high-cost older adults with complex chronic illnesses. The institutional learning gained from



planning and implementing Hospital at Home allowed for the rapid deployment of a house call program. Health care systems with existing house call programs will probably find that the infrastructure and knowledge they already have in place will make launching Hospital at Home more seamless. Having both programs in place not only benefits patients but also enables flexible staffing of nurses and physicians to meet those programs' varying demands.

A foundation of success for Presbyterian has been the organization's structure as a system, integrating health plan, delivery system, and medical group. In addition to business-unit alignment, integration allows for interoperability of information systems and access to comparative cost data.

In assessing and planning the program, it is important to involve a full complement of subgroups. For Presbyterian, disciplines and activities that needed to be involved as part of the planning and execution included clinical standards and orders (physicians); emergency department interfaces; billing and reimbursement; coding; documentation; support-process development, including intake, scheduling, medical records, auditing, and pharmacy; clinical quality and outcomes; communications and marketing; human resources and staffing model development; orientation and education; and policy development. Additionally, technical assistance from Johns Hopkins was critical in shortening adoption time and providing ongoing implementation help.

Also important are monitoring of results and adjustment of processes and procedures when indicated. For instance, Presbyterian found that almost half of readmissions happened on weekends when dedicated physician coverage was not available. In response, Hospital at Home added evening hours and hired permanent physicians for weekend coverage.

Interested systems should anticipate creation of an effective bundled-payment model. Presbyterian created a bundled care billing and reimbursement model, including hospital care components plus professional fees. To gain support and participation from other payers, the bundle had to be easily replicated without undue administrative burden.

## Hospital At Home: A Model That Works

Hospital at Home is representative of what health care reform is attempting to achieve—a high-quality clinical program that provides patient-centric, individualized care, while making the most effective and efficient use of the health care dollar. This model is highly evidence based, and Presbyterian's favorable experience with it is consistent with the wider literature. A 2009 Cochrane meta-analysis found that care in substitutive Hospital at Home was associated with a 38 percent reduction in mortality at six months compared with hospital treatment. Furthermore, patients receiving care at home had greater satisfaction with care, and their costs were lower than those for similar patients who received care in a traditional acute care hospital.<sup>8</sup>

Despite such evidence, dissemination of Hospital at Home in the United States has been limited by attitudes, payment, and policy.<sup>9</sup> Attitudinal issues arise from the assumption that hospital care is safer and that providing acute care in the home setting is inherently inferior.<sup>8</sup> Traditional payment models create barriers to new care delivery methods because of standard and sometimes restricted coverage policies. Fee-for-service Medicare Parts A and B have no payment mechanism for a Hospital at Home admission. In fee-for-service Medicare, the economic imperative for many health systems is to fill hospital beds to generate revenue.

In globally budgeted or capitated payment systems, such as the Veterans Affairs medical system and managed care, the economic case for Hospital at Home adoption is stronger, and adoption of the model has occurred.<sup>10</sup> Likewise, Medicare Advantage allows Presbyterian and peers to pilot innovative approaches, such as Hospital at Home.

The aging population will present an ever-increasing stress on limited health care systems, and capitalizing hospital beds is expensive. This puts pressure on providers and insurers to identify successful alternative care models. Presbyterian Healthcare Services' experience demonstrates again that Hospital at Home is just that—an innovative delivery model that delivers superior, patient-centered care at lower cost. ■

This article summarizes and expands upon information presented at the meeting of the Alliance of Community Health Plans with *Health Affairs*, June 20, 2011. Presbyterian Health Systems recognizes Charles Baumgart for delivering that presentation and for contributing technical assistance and critical review during manuscript preparation when he served as chief medical officer of Presbyterian Health Plan. Bruce Leff of the Johns Hopkins University was supported by a grant from the John A. Hartford Foundation

for portions of the collaborative work with the Presbyterian team. Leff is president of the American Academy of Home Care Physicians (uncompensated). He is a member of the Board of Regents of the American College of Physicians (uncompensated). Under agreements between the Johns Hopkins University and Mobile Doctors 24/7 International, the university is entitled to fees for licensing and consulting services related to the Hospital at Home care model. Under institutional consulting agreements between the Johns Hopkins

University, the Johns Hopkins Health System, and Clinically Home, the university and health system were entitled to fees for consulting services related to the Hospital at Home care model until March 2012, when that relationship was terminated. The terms of the above arrangements are managed by the Johns Hopkins University in accordance with its conflict-of-interest policies. Hospital at Home® is a registered US service mark.

## NOTES

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**Lesley Cryer** is the executive director of the Home Healthcare Division of Presbyterian Healthcare Services.

In this month's *Health Affairs*, Lesley Cryer and coauthors assess results of using the Hospital at Home model, developed by the Johns Hopkins University Schools of Medicine and Public Health, to provide acute hospital-level care within patients' homes. When implemented within Albuquerque, New Mexico-based Presbyterian Healthcare Services and made available to Medicare Advantage and Medicaid patients with common acute care diagnoses, the program achieved savings of 19 percent over costs for similar inpatients, with comparable or better clinical outcomes and higher patient satisfaction.

Cryer is the executive director of the Home Healthcare Division of Albuquerque-based Presbyterian Healthcare Services. In addition to offering patients traditional home care, home hospice, and hospice inpatient services, Home Healthcare under Cryer's leadership has expanded to include telehealth services; the Hospital at Home program described in this article; palliative care services in the hospital, in clinics, and at home; the House Calls program; and case management and disease management programs that cover

Presbyterian Health Plan populations throughout New Mexico. Cryer holds a bachelor's degree in nursing from the College of Mount St. Joseph.



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